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THE DEPARTMENT OF PUBLIC WORKS SHOPS:

A SYSTEMS APPROACH TO PERFORMANCE MEASUREMENT

by



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A THESIS

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ABSTRACT

This thesis uses aspects of the systems approach put forward by C. West Churchman as a means of developing some performance measures for the Department of Public Works Shops, Government of Alberta. The study compiles and analyses the goals of the Government as a means of determining the goals of the Department, and finally, those of the Shops. From these goals Shops policies and suitable measures of performance are formulated.

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CHAPTER I

INTRODUCTION AND THE PROBLEM

Introduction

This thesis develops objectives and policies for the Department of Public Works Shops, Government of Alberta, and from these designs an appropriate performance measurement system. The study was chosen for two reasons. The first was the author's interest in the use of performance measurement systems by governments and other public organizations. The development of such systems is usually associated with the aim of industrial organizations to enhance efficiency and profitability and their application to a public body was felt to be an interesting one. Secondly, a unique opportunity presented itself in the form of a chance to work in an existing organization which was contemplating such a system.

The approach taken in the study is normative in nature. That is, the goals and policies developed for the Shops are felt by the executives of the Department of Public Works and by the author to be those that are the best for that organization. This direction was taken because a major re-organization of the Department of Public Works changed the role of the Shops and provided us with a chance to start from the beginning in the formulation of the goals and policies. The

previously existing objectives and functions of the organization were therefore ignored throughout.

Objectives of the Thesis

The first objective was the development of feasible goals, policies and performance measurements for the Department of Public Works Shops. A second and personal objective was to gain a better understanding of the subtleties of the working of an organization and a more thorough appreciation of the systems approach through its application to the thesis problem.

Limitations of the Study

One limitation of the study was the inability of the author to define all the political constraints that could act to render some suggestions and recommendations of the study invalid. Many such constraints are recognized through their implicit influence on the formulation of the objectives of the various organizations considered, but it was seen to be an impossible task to identify and anticipate every such influence that could come to bear on the problem.

A second limitation developed in the scope of the thesis. A truly complete systems approach applied to organizations such as those dealt with herein would undoubtedly have utilized several volumes of this size. This study was thus limited to the application of important aspects of the

approach which were felt to lend themselves to the solution of the problem.

Organization of the Thesis

The thesis is presented in seven chapters, the first of which comprises the introduction, background to the problem and the problem formulation. The second and third chapters deal with the systems approach and its application to the analysis of goal structures and the development of the Shops policies and procedures which aid in identifying the information that must be supplied by the performance measurement system. Chapter four is involved with the framework for the provision of the important financial information on the Shops, and deals with the Shops as a separate accounting entity from the transfer pricing point of view. Behavioral considerations in the design of the system are considered in chapter five, and the design itself is discussed in chapter six. The final chapter offers some recommendations and conclusions.

Background to the Problem

Functions of the Department of Public Works

It is the function of the Department of Public Works to provide suitable accommodation, and the necessary furnishings and equipment to all departments of the government so that they may carry out the various functions required of them. Such accommodation is provided in buildings rented,

purchased or designed by the Department.

The Department of Public Works is also responsible for the servicing and maintenance of all provincially owned buildings. This requirement necessitates the services of a large group of men with assorted skills, the majority of whom work out of the Shops at government buildings throughout the province.

The duties of the Shops are to take part in the Department's maintenance program, to carry out minor construction work, renovations of all types, urgent construction work which cannot tolerate the delays inherent in tendering to private firms, and to perform the trucking requirements of the Department. The Shops is centrally located in Edmonton and houses about four hundred tradesmen and helpers of all categories. Its payroll is in the area of \$2,500,000 and it is responsible for the expenditure of several times that amount in the performing of its duties.

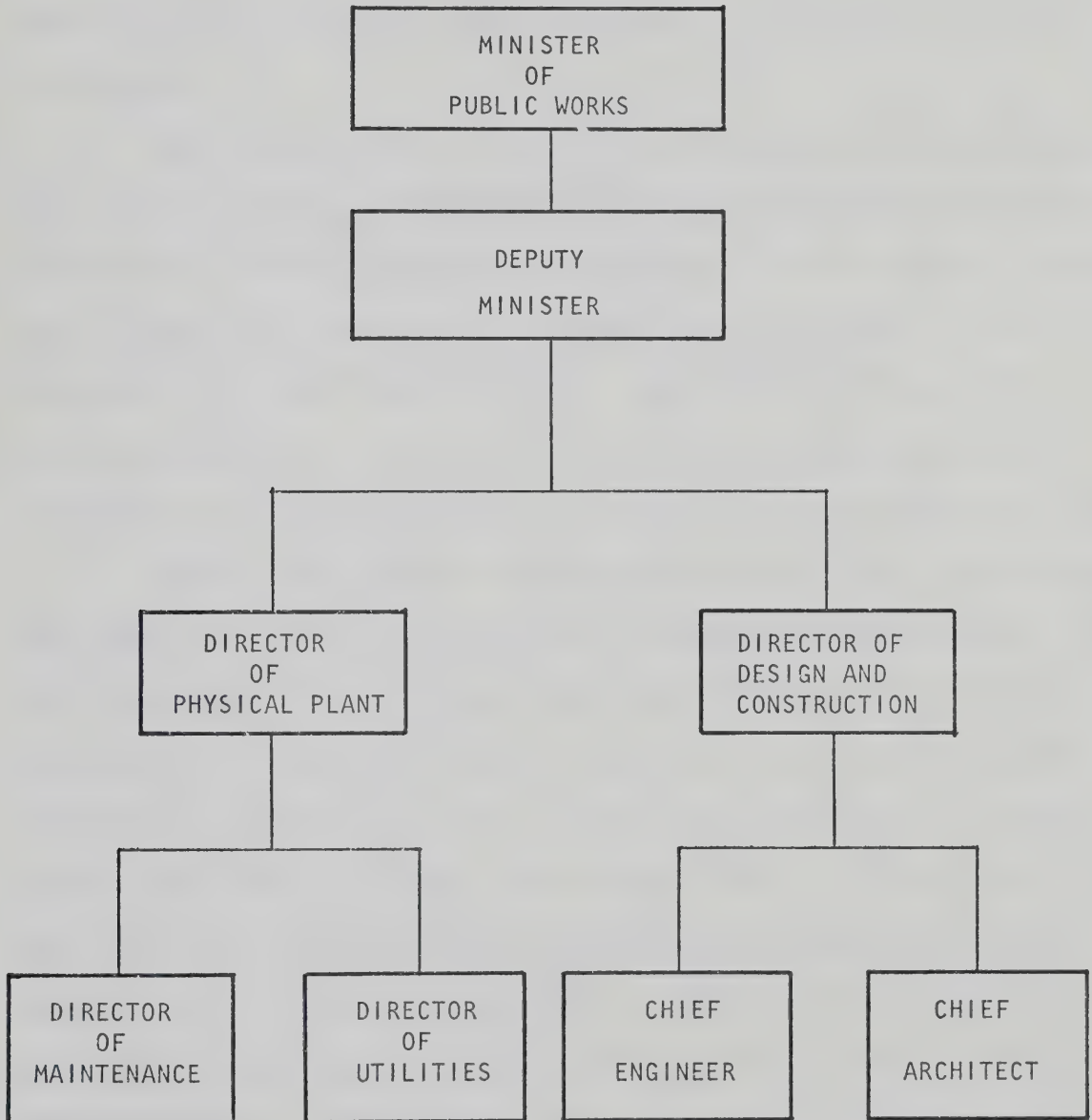
The supply of utility services including electric power, heat, water, and sewage disposal is the responsibility of the Department at the province's twenty-two largest institutions.

Organization of the Department of Public Works as of August 1969

In carrying out their stated function, the Department of Public Works was organized as shown in figure #1 in

Figure 1.1

DEPARTMENT OF PUBLIC WORKS ORGANIZATION AUGUST 1969



August 1969. The Physical Plant Division was responsible for the maintenance and utility services functions and the Design and Construction Division for all design aspects and construction inspection duties connected with the erection of new buildings.

The Maintenance Group of the Physical Plant Division consisted primarily of operating staff permanently located in the various major government buildings, and the Shops organization which was centrally located and dispatched men to the buildings as requirements arose. The Utility Group had staff permanently located in the large institutions and a technical and administrative head office organization as well.

Under this system three groups within the Department had operating responsibilities in the major institutions. The Utility Group, the building operating staff, and the Shops tradesmen were all entitled to initiate and carry out work assignments as they saw fit. This led to problems in several areas, the first of which was communication. Information on work carried out by one of the groups was often not communicated to the others. This caused duplication of effort in many cases and troubles with co-ordination of work. Thus, it was conceivable that a fresh coat of paint recently applied by one group would be disturbed by the renovation plans of another.

Split responsibility for projects requiring the effort of several groups was another problem. Should the client

department occupying the building seek adjustments, for example, to an installation of air handling equipment there was often genuine doubt as to which participating group was liable for the repair. This confusion resulted in management's feeling that the level of service the Department was supplying to its clients was less than optimal. These problems eventually resulted in the re-organization of the Physical Plant Division.

Re-organization of the Physical Plant Division

The re-organization of the Physical Plant Division was based on the concept that one man in charge of an operating staff in each major government building would have ultimate responsibility for all work carried out in that building. It would be his function to be aware of the needs of the client department, to communicate these to the Department of Public Works and to ensure that all work in the building was properly planned and co-ordinated. It was felt that this would be a major step toward rectifying the previous situation.

The re-organization took the form shown in figure #2, with building managers being appointed to serve in the major buildings.

The Effect of the Re-organization on the Shops

As the Operating and Utility Groups already had the majority of their personnel located in government buildings,

RE-ORGANIZATION OF THE PHYSICAL PLANT DIVISION



and institutions, they were subject to the problems of amalgamation and manpower shifting in the re-organization. While these problems were significant ones, their planned solutions proceeded relatively smoothly.

The role of the Shops, however, underwent a more drastic change. A Shops Committee established to study this question decided that this new role would be to act as a service group and to aid the operating managers in carrying out their responsibilities and meeting the goals of the Department at the least overall cost to the government. Their operating responsibilities were passed into the hands of the building managers and they were no longer in the position of initiating and planning major work programs. Instead the Shops were now required to await a call for their capabilities which were to be available on an as-required basis. These changes required substantial re-adjustments on the part of the Shops.

Problem Formulation

The problem of the thesis is to develop goals, policies, and a performance measurement system for the Shops that will evaluate the extent to which the Shops¹ is meeting its goals and thereby producing effort which is consistent with the aims and goals of the Department.

The approach to this problem will entail compiling and examining the goals of the Government of Alberta and

¹"Shops" is taken to be a singular expression.

specifically those goals of the Government which influence the objectives of the Department of Public Works, and sequentially, of the Shops. The goals of these sub-systems of the Government will be viewed in light of their congruence and their role in directing behavior toward carrying out the Government's overall aims.

The formulation of the specific objectives of the Shops will form the foundation for the development of policies for the organization. These, in turn, will determine decision making procedures in matters concerning the Shops and the Department.

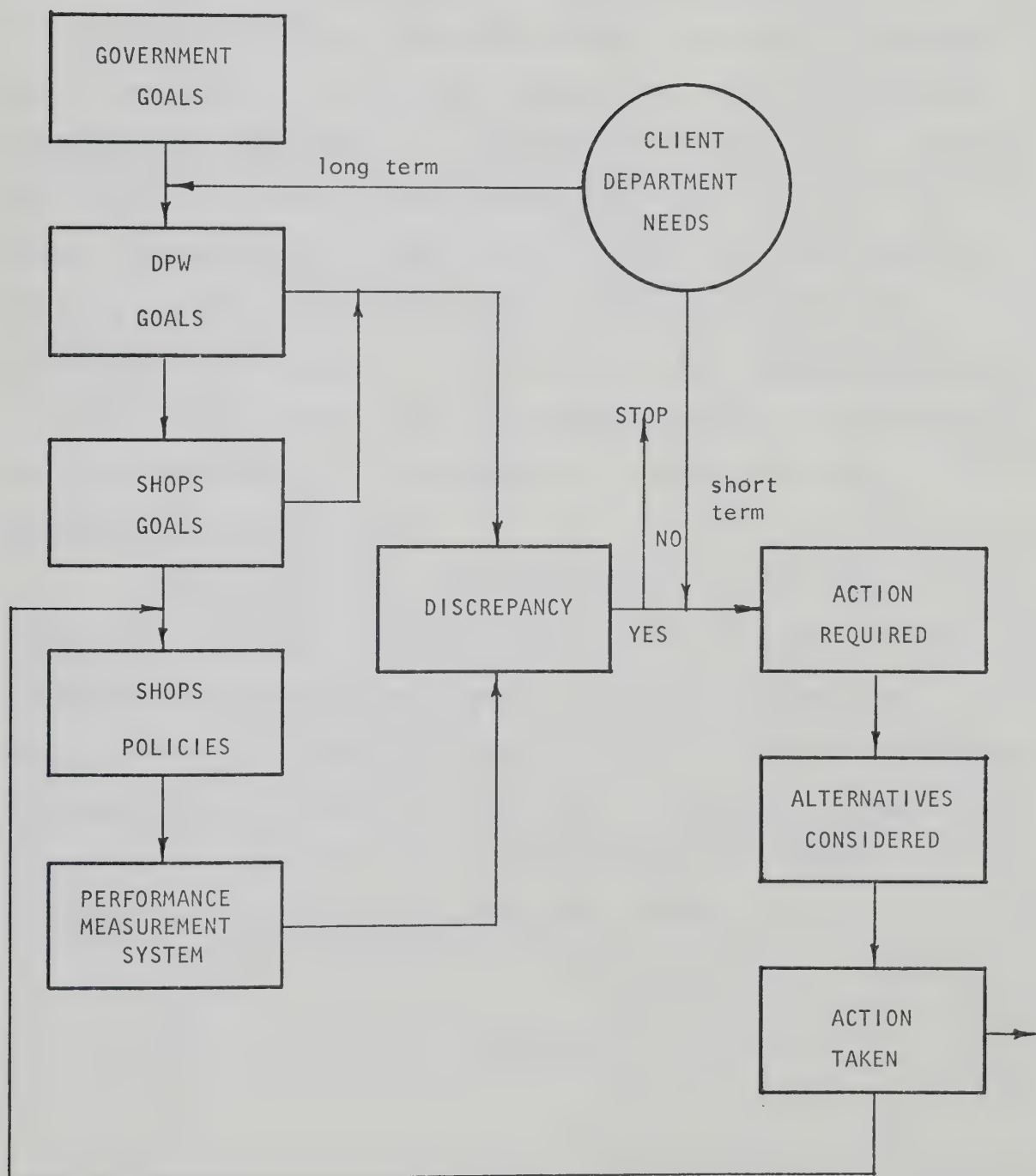
The design of the performance measurement system which will supply the information required by the decision makers is the second aspect of the problem. A major factor to be considered in this design is the possible dysfunctional consequences resulting from attempts to measure the performance of an organization such as the Shops which has never been subject to this type of scrutiny. Some of the implications which have particular relevance for the Shops will be examined.

A Model

As an aid to visualizing the approach to be used and to show how the results of the completed exercise may be of use to the Department, a simple model follows.

Figure 3.1

A MODEL OF THE APPROACH



The model shows the line of reasoning developed in designing a performance measurement system by initially considering the overall goals of the government and analyzing how these ultimately have an impact on the Shops.

The model indicates as well how the Shops' policies can be changed to continually adjust and refine the process by which the objectives of the Department can be met. Should the performance measurement system show that the goals of the Shops and those of the Department are not being met because of poor performance by the Shops, alternate methods of rectifying the situation can be outlined and action accordingly taken. The action could conceivably result in the changing of Shops' policies and procedures as a means of better meeting a particular goal.

The needs of the client departments have substantial effect on the Shops. In the longer term they influence the formulation of Departmental goals. In the shorter term these needs, for example a requirement for office partitioning, provide a spur to action on the part of the Shops. Again, if these short term needs are not adequately met, changes in policies and procedures could be the result.

CHAPTER II

SYSTEMS AND THE SYSTEMS APPROACH

Introduction

The purpose of this chapter is to introduce the idea of systems and to examine the systems approach as advocated by C. West Churchman.¹ Appropriate aspects of his philosophy are selected and developed for use in formulating guidelines along which the solution to the thesis problem then proceeds.

Systems

The idea of "systems" and the use of the words "systems" and "systems approach" seem to be omnipresent in the management literature of today. Webster's defines systems as "a set or arrangement of things so related or connected as to form a unity or organic whole: as, a solar system, or irrigation system."² Ackoff states that systems can be

¹C. West Churchman, The Systems Approach, N.Y: Dell Publishing Co., 1968

²Webster's New World Dictionary, College Edition, Toronto: Nelson, Foster and Scott Ltd., 1959, P.480

defined as ". . . any entity, conceptual or physical which consists of interdependent parts",³ again putting emphasis on the interdependency and interrelationship between the elements of the system.

Churchman is interested in dynamic behavioral and social systems which are influenced by man, which influence man, and which play a large part in his life. Churchman sees systems as ". . . a set of components working together for the overall objective of the whole",⁴ including in his definition the distinguishing characteristic of such systems, their teleological behavior. As this study is concerned with an existing behavioral system, it is this goal directed behavior which concerns us as well.

The Systems Approach

To Churchman, the systems approach is simply a way of looking at the system and its components.⁵ The aim of the approach is to circumvent narrow minded thinking by characterizing the nature of the system in such a way that decision

³R.L. Ackoff, "Systems, Organizations and Interdisciplinary Research", in Systems Research and Design, ed. by D.P. Eckman N.Y: John Wiley & Sons, Inc. 1961, P.27-28

⁴Churchman, Op. Cit., P.11

⁵Ibid.

making can take place in a logical and coherent fashion.

One way of achieving this aim is to spur continuing debate amongst conflicting viewpoints or different ways in looking at a given system. These conflicting viewpoints are seen by Churchman as inevitable. Krech and Crutchfield⁶ support this by stating that the way in which an individual responds to stimuli is shaped by his "cognitive world" and that no two persons have the same "cognitive map" or live in the same cognitive world. Each person has an individualized image of the world because his image is the product of several determinants, these being:⁷

1. His physical and social environments.
2. His physiological structure.
3. His wants and goals.
4. His past experiences.

Psychologists further state that the cognitions of the individual are selectively organized.⁸ Only certain of a set of objects within his visual range enter into an individual's cognitions and only certain characteristics of those objects are perceived.⁹ Thus, each person views the

⁶D. Krech, R.S. Crutchfield, E.L. Ballachey, Individual in Society, N.Y: McGraw-Hill Co., 1962, P.17

⁷Ibid, PP 17-18

⁸Ibid, P.20

⁹Ibid, P.20

same object or circumstance in different ways, and it is this point which Churchman recognizes in his approach to systems. He advocates a continuing clash of differing viewpoints, a continual debate between ideas, in the belief that exposure to assumptions different from his own will aid the analyst expand his vision and become more sensitive to the system he seeks to study. It is this reasoning that leads Churchman to conclude that the first real step in the systems approach occurs when one sees the world through the eyes of another. For it is in this manner that the analyst comes to realize that his particular view is terribly restricted.

Closely linked with Churchman's suggestion for a continuing debate amongst conflicting ideas is the issue of deception-perception. He states that

"... the ultimate meaning of the system's approach therefore, lies in the creation of a theory of deception and in a fuller understanding of the ways in which a human being can be deceived about his world."¹⁰

There is no adequate measure of reality and this factor must be considered by the analyst in his studies.

In Churchman's philosophy as well is a need to understand the whole system before a meaningful analysis can proceed on any one part, for only by probing and questioning the

¹⁰Churchman, Op. Cit., P.230

direction of the whole can the analyst determine the place and validity of any segment. One system is always embedded in another larger system with interactions taking place between the two. In the thesis problem, the Shops is a system in itself, but it exists and interacts as a subsystem of the Department of Public Works. The Department again, can be viewed as a complete system and as a component in the larger Government system, and so on. The important point to be made is that the system itself can never be removed entirely from the influence of the larger system in which it resides.

Churchman's approach to performance measurement reflects this concern for the interrelationships of systems and he contends that performance measures of subsystems must be tied to overall system effectiveness. Thus, as the measure of the performance of a component increases, so does that of the system under scrutiny. Otherwise it can be surmised that the component's performance measure is not indicative of the extent to which the component is aiding the system in its attainment of its goals. Churchman feels that there are five basic considerations that must be kept in mind.¹¹

¹¹Ibid, P.29

These are:-

1. The total system objectives.
2. The system's environment: the fixed constraints.
3. The resources of the system.
4. The components of the system, their activities, goals, and measures of performance.
5. The management of the system.

There can often be some confusion regarding the real objectives of a system, the first aspect which Churchman mentions. The true measure of the objectives is determined by the actual performance of the system, that is, by its actions and accomplishments. These are often substantially different from the stated objectives, which can be relatively vague statements from decision makers about what they would like to accomplish, or what they think might be a good idea to accomplish. Churchman suggests that a true objective is one for which the system will sacrifice other sub-goals.

It is this first aspect which will form an important part of the study itself. As implied in the problem formulation, the system will be studied from the point of view of its objectives, and it will be the formulation and analysis of those objectives for the system and its subsystems that will provide a path to the solution of the core problem.

The system's environment, Churchman's second factor, is that which is fixed and given from the system's point of view. If a budget cannot be changed, it is part of the

environment, but if the system has the means to exert influence on budget changes it can be regarded as lying within the boundaries of the system. This is of particular importance in the thesis in that it is concerned with the study of a political body. It is clear then, that there will be a substantial political influence that must be considered in carrying out the study and developing its recommendations. This constraint must be defined as far as is possible lest the results of the study be declared impracticable due to their political unpalatability.

The resources of the system are defined as the means that the system uses to carry out its objectives. Resources are manipulable elements that the system can control and change to its own advantage if its needs are better met by its so doing.

The fourth item for consideration is the components of the system which are those subsystems that take the specific action required to aid the system meet its objectives. The identification also facilitates the measure of performance of the system, as it is seen that the component's performance must enhance that of the total system. The study will treat the Shops as the major component with which it is concerned, and will justify its selection as an important element for analysis.

The last aspect of the system to be considered is its management. Management's function is to view all other

elements previously discussed, the setting of overall objectives, component objectives, planning, the manipulation of the resources of the system and the measuring of performance. A major concern of the study is found in this factor, as the study is ultimately attempting to provide the information required by management to carry out its function of directing the system. This concern, as well, provides some of the motivation required for the successful completion of the study.

Systems and the Thesis Problem

In applying Churchman's philosophy to the thesis problem it is profitable to discuss the five steps of his approach in more detail to more fully define their use in the context of the study.

Objectives

As a major step in understanding the whole system in which the Shops is embedded, a study of the goals of the Government and the Department is relevant. These goals indicate the direction and the role of the whole system and are an aid in the comprehension of the way in which the Shops fits into the overall scheme.

Churchman feels that the real goals of a system are identifiable as those for which it will sacrifice sub-goals. With an organization such as the Government, however, it is

impossible to monitor activities to determine the "real" goals, thus those stated in the White Paper on Human Resources Development, and articulated by Government members are taken to be the given goals.

The articulation of Government and Department objectives, as well, is the foundation for the performance measurement system of the Shops.

A normative approach is taken in the formulation of the Shops goals, and to some extent, the goals of the Department. In this study these goals are developed in terms of what they should be in order to best direct behavior toward meeting Government aims.

Constraints

To a large extent the constraints on the Shops are defined through the goals of the Government and the Department. It can be argued that the Shops do have some influence in the development of Department goals, but this effect is long term and most likely minimal. It is more realistic for our purposes to treat these goals as "givens" that lay down guidelines for Shop operations.

The political constraint is one that is difficult to explicitly identify and yet it necessarily infringes on many aspects of the Shops' operations. The directives received from the political hierarchy often require special effort from the Shops which may not be justified on a purely

economical basis but which might make a political sense that cannot be measured in terms of dollars. Any of the study's conclusions must be tempered by an awareness of these ever present factors which defy objective measurement.

There are other constraints evident that have implications for the Shops and as well for the recommendations of the study.

There is no open market for the Shops and the provision of their services is confined to the Department of Public Works. This has some implication in the development of their capabilities and supply of services.

In addition, there is a tendering constraint on the Department that affects the Shops directly and has some bearing on the results of the study. This constraint makes it mandatory for the Department to release for open tender all work that has a value of greater than \$25. This tendering process requires specification writing, tender mailing, tender receipt, and evaluation, that can take from six to eight weeks, the result being that private firms are rarely considered for minor work that can be done on short notice by Shops personnel.

No significant constraints were identified that related to the accounting and record keeping system with which the study came in contact. The power to change these systems lay largely in the hands of Department executives who must gain the approval of the Provincial Auditor. The

Auditor is receptive to those changes which aid the Department and still provide his office with information equivalent to that available before the change. This situation was not felt to be a major constraint.

Components and Resources

For the purposes of this study it was felt that rigorous identification of components and resources was of limited value. The Department of Public Works and the Shops are taken as important components of the overall system, namely the Government of Alberta. The manipulable resources of these groups are obviously many, and they are treated in an abstract manner in the thesis.

Management of the System

The thesis is concerned with the management of the Shops section of the system and it is hoped that the thesis study and performance measurement system will be to the benefit to this group.

CHAPTER III

A GOAL ANALYSIS

Introduction

The direction outlined in Chapter II suggests a global approach to the core problem of the study. The first step is the consideration of the objectives of the Government of Alberta, as it is that body which lies at the outer boundary of the system defined by the thesis.

In the formulation of the objectives of the Government certain value judgments are apparent. As these form a foundation from which the objectives are derived, they are stated below:

- Human resources will be treated as being intrinsically more important than physical resources.
- Prior consideration will be given to human beings individually (persons), rather than to human beings collectively (society).
- A free enterprise economy, in which all individuals have maximum opportunity to participate, will be regarded as more desirable than a state regimented economy.
- A supporting function, rather than a domineering

function, will be ascribed to the state relative to resources development.

The Objectives of the Government of Alberta¹

The overall objective of the Government of Alberta is the development of a society of free and creative individuals within the Province. As it is important that the emphasis be laid on the individual human being in society, rather than on society itself, the approach to Human Resources Development will be oriented towards encouraging and enabling each individual to develop voluntarily to the maximum degree that he himself desires and to which he is capable. The formulation of other objectives by the Government has as its ultimate aim the aiding of this development of the individual so there can emerge a society, the characteristics of which are determined by the individuals themselves.

1. In keeping with the aim of the development of the individual, the Government has the objective of fostering a development climate characterized by:

- (a) Freedom of social and economic activity and enterprise for private individuals and associations.

¹These goals are formulated by the author from the Government's White Paper on Human Resource Development and from conversation with E. Schmidt, Exec. Asst. to Premier Strom. They are not to be construed as statements by, or on behalf of the Government of the Province of Alberta.

- (b) A profound respect for the liberty of individual citizens, associations and communities.
- (c) A pronounced sense of social responsibility and humanitarian concern on the part of all sectors of Alberta society, in particular, the private sector of the economy.
- (d) A pronounced sense of economic awareness and responsibility on the part of all sectors of society, in particular, those sectors not directly engaged in industrial and commercial activity.

2. The Government has the objective of establishing for the people of Alberta a politically stable environment in which their social and economic goals can be met. The political climate will be one in which responsible private enterprise and investment capital will not be faced with threats of nationalization. The Province of Alberta has certain geographic and economic disadvantages in competing with other areas of the world, especially in the vital petroleum industry, and one way in which these disadvantages can be offset is through the provision of a stable political environment in which large scale long-range investment can be made with confidence.

3. The development of the physical resources of Alberta to their maximum extent must remain an explicit

objective of both Government and people. It is recognized that the physical resources and economy of the Province are a means to an end, and that the overall purpose and objective in this development must henceforth be to facilitate Human Resources Development. Because such physical resources development is absolutely essential in meeting the Government's overall aim, the necessity of establishing and maintaining a strong provincial economy cannot be overemphasized.

4. It is an objective of the Government to facilitate the development of a free and responsible private enterprise economy in Alberta. This will be accomplished by encouraging private citizens and associations to assume responsibility for the performance of essential economic functions and tasks, rather than having these functions and tasks performed by the state. As a matter of policy the Government will refrain from directly involving itself in the performance of such functions which private citizens and associations are willing and able to perform better and more efficiently.

5. The Government has committed itself to the provision of services which will foster the maximum development of each individual's potential and, at the same time, ensure that regardless of status, no resident of the Province will lack the necessities of life. The Government believes that it is the responsibility of society collectively to bring necessary facilities and services within financial reach of every citizen, but it is also the responsibility of each

individual personally to assume a reasonable share of the costs of benefits derived from such facilities and services.

6. The Government is committed to the attainment of quality and excellence in all its programs and services. It will accomplish this by applying the latest developments in equipment and organizational techniques to its own structure and operations in providing maximum benefits from its usage of public monies.

Ideally all the goals of the Government will have some implicit influence on the behavior of the Department of Public Works and on the formulation of its goals. Given the overall role of the Department in supplying accommodation for all other Government agencies, however, it is seen that certain of the Government objectives will have a strong and explicit influence on the Department's goals, and it is these that are discussed in the following.

In carrying out its aim of enabling each individual in the Province of Alberta to develop to the maximum extent to which he is capable on a voluntary basis, the Government has committed itself to the provision of physical facilities of many types. The achievement of this goal requires a growing University, medical and health facilities, schools, public service institutions, special educational facilities for the retarded and handicapped, and a host of other institutions. The Department of Public Works has a major charge in the supply

of the physical facilities involved in the program implied by this particular Government goal. It is the Department's role to have the appropriate buildings made available in an optimum manner.

The Government has stated its intention to achieve a level of excellence in its programs and to make the best use of public monies in carrying out these programs. This goal must be a strong bearing on the formulation of the Department's objectives, for the plans and programs of the Government are carried out by the individual departments, and for the Government to achieve excellence, the Department of Public Works must also achieve it. The optimum usage of public monies is an all pervasive Government concern and this aim must also be articulated by the Department.

In striving toward a strong economy, the Government of Alberta has chosen to encourage private enterprise over the development of a state controlled economy. One of its goals is to refrain from engaging in activities which are within the domain of private enterprise, or which private citizens are willing or able to do better than the Government. Again, this objective has strong implications for the Department of Public Works. The activities of the Department are by necessity numerous, and vary in scope to the extent that several are much like activities that are provided as well by private firms. It is seen from this that it is a role of the

Department of Public Works to analyze its operations carefully and thereby restrain itself from being involved in services that are directly parallel to those provided by local private groups.

The Objectives of the Department of Public Works²

The overall objective of the Department of Public Works is to provide suitable accommodation for all departments of the Government to facilitate the carrying out of the various functions required of them. The goals and efforts of the divisions and groups within the Department are directed towards the realization of this aim.

1. It is an objective of the Department of Public Works:

- (a) To provide buildings of proper design and construction that meet the particular requirements of the client department.
- (b) To provide these buildings in an optimal manner through rental, purchase or construction.

2. The Department of Public Works has the objective of providing an adequate level of maintenance and service to all provincially owned buildings with the exception of various

²The goals of the Department of Public Works have been formulated through discussions with, and the help of, executives of the Department.

self-governing institutions such as the Universities at Edmonton and Calgary. This level of maintenance is to be one which minimizes the deterioration of equipment and facilities commensurate with the cost of so doing.

3. The Department of Public Works has the objective of providing proper furnishings and equipment to all departments of the Government to enable them to carry out their intended functions.

4. It is the goal of the Department of Public Works to serve the special needs of the client departments requiring urgent and minor construction work in the provincially owned buildings they occupy.

5. The Department of Public Works will continually review its organizational structure and its methods and procedures in an effort to apply improved techniques to the carrying out of its stated objectives.

7. It is the aim of the Department of Public Works to achieve a level of excellence in the carrying out of its programs and projects and to use public monies in the most efficient manner in reaching that goal.

This last objective combined with the Government's aim to foster free enterprise wherever possible results in an important Department policy on this question. This policy articulates the position of the Department to refrain from engaging in activities that are directly parallel to those

readily available from private firms wherever possible, unless it is clear that the Department's overall objectives are better served by its so doing.

The statement of the Department's objectives now allows a focus on the role of the Shops. As the Shops are an integral part of the total organization, it is important that their effort is properly directed toward the accomplishment of the Department's goals. This is the main concern of this study.

An analysis of the Department's goals reveals several that can be influenced through the operations of the Shops. The first of these is that concerned with the provision of an adequate level of maintenance to provincially owned buildings. In many cases it has been found that it is uneconomical to retain at each building, a full time staff capable of performing a wide variety of technical maintenance procedures. The Shops consequently have the role of supplying this skilled manpower to the building management whenever there is a requirement. It is apparent in this situation that the goal of the Department and the operation of the Shops are closely related.

For similar reasons, to those mentioned above, the Department does not staff a capability at each building to provide for all urgent and minor construction work. This capability is an important one in meeting the needs of the individual client departments in this area, and again the

work force is supplied on a call basis by the Shops. Thus Shops performance vitally affects the achievement of this goal.

It is a stated aim of the Department to achieve the most efficient usage of the public monies allotted to it. Since the Shops payroll is in excess of \$2,500,000 and because expenditures on work carried out by Shops personnel is several times that amount, it is inevitable that this objective should have a strong impact on the formulation of the Shops' goals.

Finally, the policy of the Department to refrain from engaging in activities that are available from private firms whenever possible, has significant implication for the Shops. The vast majority of services provided by the Shops are readily available as well from local private groups. Unless it can be shown that the needs of the Department are better served by utilizing its own work force rather than that of private enterprise, the long term indication would be for the Department to withdraw from the provision of those services.

It is evident from the analysis that the task facing the Shops in its new role as a service group is becoming better defined. It is important that the operation of the Shops group be such that it is providing its repertoire of services at the least cost to the Department, and as well, that these services are at a level of quality not generally

available from private enterprise.

The Objectives of the Department of Public Works Shops³

The preceeding discussion now allows the formulation of Shops' objectives.

The overall objective of the Department of Public Works Shops is to aid the operating group to carry out its role more efficiently and effectively by providing services to that group at the least overall cost to the Department.

It is the aim of the Shops to establish itself as an effective service group by utilizing its advantages in communication and co-ordination with the operating staff to provide a level of service that is equal to or better than that available from private enterprise.

The Shops has as an aim the continual review of its work methods as a means of developing new and improved procedures for carrying out its function as a service group.

It is an objective of the Shops to provide high quality preventive maintenance services to the operating group on an as-required basis.

The Shops has the objective of developing policies to effectively deal with urgent and minor construction work.

³The goals of the Department of Public Works Shops have been formulated through discussions with, and the help of, executives of the Department.

Shops' Policies

Glans et al state that policies are ideas, attitudes, and philosophies that provide guidelines for the implementation of an organization's goals and objectives.⁴ This is the definition adopted in the approach to the problem of formulating policies for the Shops. The following policies are separated into two groups; the internal, which involve guidelines for the improvement of the Shops' own methods and procedures, and the external, which monitors the needs of customers and the extent to which they are being satisfied.

It will be the policy of the Shops:

1. To develop means of effective cost control, including a system of planning and budgeting.
2. To develop manpower planning as a means of promoting the best use of personnel.
3. To review procedures periodically and to compare them with other groups.
4. To develop competent tradesmen for maintenance and construction duties.
5. To develop supervisory specialists in the trades.
6. To develop competent project groups to enhance the capabilities and flexibility in carrying out larger construction projects and renovations.

⁴T.B. Glans, B. Grad, D. Holstein, W. Myers, R. Schmidt, Management Systems, N.Y: Holt, Rinehart and Winston Inc., 1968, P.53

7. To co-ordinate work closely with building managers.
8. To view the operating group as preferred customers for Shops' Services.
9. To determine the quality of the Shops' services by monitoring the attitudes of the operating group.
10. To develop the communication links necessary to obtain as much information as possible on planned programs that might require Shops' services.

Financial Information

From the analysis of the goals of the Department and those of the Shops an important theme running through the discussion can be defined. This theme is concerned with efficiency, the ratio of the value of output to the value of input, and is expressed in terms of the usage of public monies. The theme identifies the most important type of information that is required in ensuring that the effort of the Shops is directed toward meeting the goals of the Department; financial information. This information must be of such a nature to answer the question of whether an adequate level of efficiency is being derived from this usage. This is particularly true in view of the fact that the majority of the services supplied by the Shops are available elsewhere. The problem to be resolved is whether these services are being supplied at the least cost to the

Department and to the Government.

An important goal of the Department is to refrain from engaging in activities that are similar to those supplied by private groups unless its overall objectives are better met by its so doing. We find that the Shops are, of course, engaged in those very activities in which the Department does not particularly wish to be involved. The only justification for this would seem to be if the operation of the Shops directly aided a more complete achievement of the Department's goals. This could be accomplished only through the Shops' supplying services to the Department at a cost lower than that available for equivalent services from private firms.

Information from the Customer

Several of the goals and policies of the Shops are relatively subjective in nature, requiring a measure of judgment in determining the extent to which they are being met. The aim of the Shops to establish itself as an "effective" service group and to provide a level of service "equal or better" than that of private enterprise are examples. The judgment as to the effectiveness and level of Shops services must come at least in part from those who receive these services, the Department's operating group and the client department personnel. Some means of measuring the Shops' ability to satisfy these groups would be an

important part of a performance measurement system.

Preventive Maintenance Information

A major function of the Shops is its role in the Department's preventive maintenance program. The regular maintenance checks and routines of the program are carried out to circumvent the possibility of equipment failure and to decrease the rate of equipment deterioration. As a good deal of effort and money is being spent on preventive maintenance the performance measurement system should consider a means of evaluating the program.

CHAPTER IV

A TRANSFER PRICING APPROACH

It has been established that financial information is an important aspect with which the performance measurement system must be concerned. This chapter examines the present accounting system and evaluates its adequacy in meeting the information needs of management. Some changes are suggested and a discussion of transfer pricing forms a point of departure for designing an alternate system based on those changes.

The Existing Accounting System

The present accounting system does not discriminate between many of the costs incurred in the operation of the Shops and similar costs incurred by other groups within the Department of Public Works. Management, clerical, accounting, and other categories of salaries are all gathered in one appropriation that covers all groups without differentiating among them.

This situation exists as well in the accounting records covering work done by Shops personnel which is roughly split into two categories, maintenance and capital projects. In the case of maintenance work direct labour and material costs are gathered and charged against the appropriate building. Whether the work is done by the Shops

or by private groups is not distinguishable by the records. As the Shops does not keep its own data on the volume of maintenance it carries out it is almost impossible to determine the value of the work it does over a given period. For capital projects each job is allocated a specific number against which costs are accumulated. Again, only direct labour and material costs are aggregated for these jobs, and no indication can be obtained from the records as to the supervisory effort, vehicle costs, or special technical effort required in any given case. All such costs are covered by separate appropriations and cannot be identified with a specific capital or maintenance project. The resulting cost accumulation for a particular job is thus not a true indication of the effort required to carry it out.

It is difficult under these circumstances to obtain any indication of the performance of the Shops. Even attempts at subjective evaluation, or at gross measures of effectiveness are thwarted by the lack of data. Total management costs are not readily available, nor are supervisory, clerical, accounting or technical staff costs. The present system does not provide for data on the dollar value of work done by Shops tradesmen over a given period on either capital or maintenance projects. Similarly, payroll figures either by trade category or in total cannot be obtained except through tedious manual gathering operations.

This situation makes it difficult to calculate helpful statistics such as overhead per man hour of labour,

supervisory costs as a ratio of value of work done, etc., which could be useful for comparison with private firms, to determine trends over several years, or to provide information that facilitates organization and allocation of resources. This lack is an important one in view of the Department's aim to effectively use the public funds entrusted to it.

The Shops as an Accounting Entity

In the following section it is proposed as a first step in the solution of the present accounting system's inability to supply adequate financial data, that the Shops be established as an accounting entity. This suggests that the Shop's financial information be gathered, aggregated and kept separate from that of other groups in the Department, thereby making it readily available for analysis.

It is necessary to establish the Shops as an accounting entity to enable management to carry out a financial performance evaluation of the organization. Many of the questions the Department's management are presently asking about the Shops are those which are best answered by financial information, information which is currently not available or which is deeply buried with related but irrelevant data. In considering the efficiency of the Shops as regards their usage of public funds it is apparent that readily available and properly designed information is required. Only through its establishment as an accounting entity can the financial affairs of the Shops be made explicit and

clearly separated from the remainder of the Department.

The Shops as an accounting entity will provide more information to management for both planning and control. As an example, it is a goal of the Department to check its entry into areas served by private groups whenever feasible. Accurate accounting data is a means of aiding the decision of which activities will be better handled by the Shops and which will be better handled by private enterprise. Conversations with J.C. Burton, Special Services Engineer of the Department of Public Works, reveal that in many cases the Department is unaware as to whether it is more desirable in the long run to expand certain Shops functions such as trucking to meet growing needs, or to handle the extra work by using private firms. Properly designed accounting information can help resolve such matters.

The use of the accounting entity concept can result in the provision of more accurate costing data to building managers and others who use the Shops' services. At present building managers are hampered in their attempts at cost control because information on the complete costs of a particular renovation or maintenance job for their building is unavailable. Only direct labor and material charges are currently levied, resulting in unrealistic cost figures being used by building managers in decision making. The accounting entity concept would enable the gathering of all charges associated with a project and the provision of more accurate costing data to the building managers.

The above discussion points out the advantages of treating the Shops as an accounting entity. The individual cases presented point directly to the conclusion that such treatment will aid the accomplishment of the Department's objectives.

Transfer Pricing

In considering a means of measuring the efficiency of the Shops' usage of public funds it is recognized that the Shops is organizationally separate from the groups to which it supplies its services. As this situation parallels a typical transfer pricing case, it is profitable to use an examination of transfer pricing as a point of departure for the discussion on the optimum means of measuring Shops' performance in this area.

A transfer price is defined by Horngren as the

. . . price charged by one segment of the organization for a product or service which it supplies to¹ another segment of the same organization.

In the context of the business enterprise, the purpose of transfer pricing is to establish prices for the goods and services exchanged between divisions of a company so that the performance of each division may be fairly evaluated, and at the same time, to motivate the divisions

¹Charles T. Horngren, Cost Accounting: A Managerial Emphasis, Second Edition, Englewood Cliffs, N.J., Prentice-Hall (1967) P.854

to act in a manner that will maximize the profits of the firm as a whole.² In the context of the thesis problem the purpose would be to fairly evaluate the Shops' performance and to motivate management to work towards the attainment of Department goals.

The problem is an important one, because the prices which are set on internal transfers affect the measure of the organization's performance and in the long run, its level of activity.

Transfer prices are usually derived from one of two alternatives, some form of cost or some form of market price.

The cost basis provides for the transfer of goods and services according to the amount of direct cost accumulated on each item. The cost may be standard, normal, or some variation of either. Cost plus return on investment systems³ or marginal cost systems⁴ are also utilized.

The market price basis provides for the transfer to take place at a price, or a variation of a price, determined by a free market external to the divisions. Where no clear cut outside market exists, some form of negotiation between the divisions is usually advocated as a means of establishing

²Jack Hirshleifer, "On the Economics of Transfer Pricing", Journal of Business, Vol.29 (April 1956) P.172

³Paul W. Cook Jr., "Decentralization and the Transfer Price Problem", Journal of Business, Vol.28 (April 1955) P.91

⁴Hirshleifer, Op.Cit.

a fair substitute.

Hirshleifer takes a traditional economics approach to transfer pricing with the goal to establish that mode of pricing which leads autonomous profit centers to make decisions yielding the largest aggregate profit for the firm as a whole.⁵ He assumes demand and technological independence between the buying and selling division, meaning that an external sale by either division does not reduce the external demand for the products of the other and as well, that the operating costs of each division are independent of the level of operations being carried on by the other.

Hirshleifer examines the problem of the firm in light of its search to produce its optimum level of output and arrives at the conclusion that this level is at the point where the sum of the marginal costs of the two divisions equals the competitive market prices they face.⁶ It is at this level that the firm as a whole will achieve maximum profit. Any output below this level will result in a missed opportunity to add to profits, as total marginal cost will be below market price, and any output above the level will detract from total profits as the sum of the marginal costs will be greater than the revenue received.

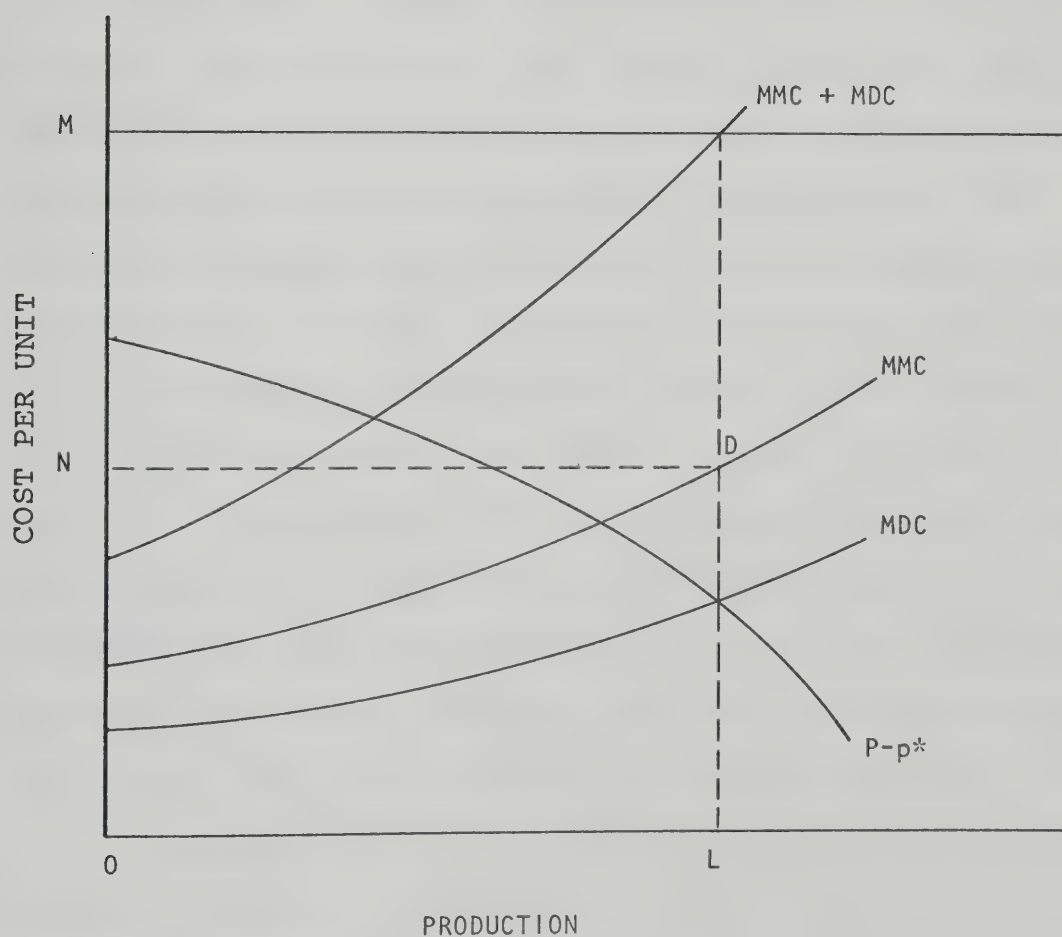
⁵Ibid, PP 172-173

⁶Ibid, PP 173-174

Hirshleifer's graphical analysis is presented as follows:

Figure 4.3

HIRSHLEIFER'S GRAPHICAL ANALYSIS



SOURCE - Jack Hirshleifer, "On the Economics of Transfer Pricing", Journal of Business, Vol.29 (April 1956) P.173

The analysis clearly points to the theoretical optimum level of output that should be produced by a firm which is attempting to maximize profits, but what should the transfer price be in this situation? Hirshleifer argues that the manufacturing division's supply curve is MMC, its marginal cost curve, as the division will continue to supply product until its marginal cost equals the price it receives. The distribution division thus recognizes MMC to be the transfer pricing schedule, any point on which will determine the level of output it can distribute. Given this, the distribution division determines a curve which is the difference between the market price and the transfer price schedule, MMC. It sets its output level where this curve, $P - p^*$, cuts its own marginal cost curve, which is shown as OL on the graph above. The transfer price to be set is $LD = ON$, a level which will induce the manufacturing division to continue its output until it reaches OL, where its profit is maximized. The distribution division faced with the transfer price ON plus its own marginal cost will distribute the product to the same level to maximize its own profits.

Hirshleifer's rigid proof cannot be attacked on economic grounds, but it does have some shortcomings in attempts to apply it in practice.

Firstly, it assumes that the organization has the accounting means and methods to supply perfect cost information for decision making, an assumption which is far from realistic. The examination of the present accounting system

at the Shops clearly shows it is incapable of providing such information. The analysis is further based on knowing exact costs at every conceivable level of production, a requirement which any accounting system would find impossible to satisfy, given the wide range of discretion in procedures and practices afforded to accountants.

Again, the analysis assumes that firms attempt to maximize profits. Authors such as McGuire,⁷ Galbraith,⁸ Baumol,⁹ and Cyert and March,¹⁰ among others, have argued persuasively that this is not the only goal of business. These authors see the goals of the firm as being developed through the collective interaction of management, as reflecting their collective goals, and therefore being a distillation of many of these goals, only one of which is profit based.

Risk is a further major factor not considered in Hirshleifer's work, a factor which could lead to profit satisficing, according to Galbraith.¹¹ The risk inherent

⁷J.W. McGuire, Theories of Business Behavior, Englewood Cliffs, N.J. Prentice-Hall Inc. (1964) P.74

⁸J.K. Galbraith, The New Industrial State, N.Y: The New American Library (1968)

⁹W.J. Baumol, Economic Theory and Operations Analysis, Englewood Cliffs, N.J. Prentice-Hall Inc. (1961)

¹⁰R.M. Cyert, J.G. March, A Behavioral Theory of the Firm, Englewood Cliffs: Prentice-Hall Inc. (1963)

¹¹Galbraith, Op.Cit., P.177

in profit maximization, is felt by these writers to motivate the firm to lower its sights on behalf of greater security and assurance of survival.

The examination of the goals of the Shops shows concern with levels of service, flexibility of service, development of capabilities within the organization and other aims besides that which would correspond to the maximization of profit. Even the Department's goal of the most efficient usage of public funds is interpreted as providing effective services as well as low cost services.

Cook agrees with Hirshleifer that one division of the Company should not be allowed to increase its profit by reducing that profit of the whole Company.¹² To avoid this he suggests that the transfer pricing system motivate transfers only if the profits of the Company as a whole are increased.

Cook's analysis concludes that the best method to use to achieve this aim is a market based system of transfer pricing.¹³ He assumes throughout that both the buying and the selling division has access to well developed outside markets that provide the required information.¹⁴ He feels, in addition, that both divisions are being treated fairly under these circumstances and that this in itself is a factor

¹²P.W. Cook Jr., Op. Cit., P.87

¹³Ibid, P.88

¹⁴Ibid.

of some importance.

Under a market based system, the selling division cannot make a sale to outside customers at higher prices, therefore it is not being forced to take lower profits than it could realize elsewhere. The buying division, at the same time, cannot find a supplier who can provide lower prices, so neither is it at a profit disadvantage.

Dean favors negotiated competitive prices for use between divisions who are respectively free to deal in the outside market.¹⁵ Dean feels that this method can make each division's procurement, processing and distribution sensitive to market requirements and responsive to competitive alternatives.¹⁶

"Negotiated competitive" prices are a variation of market based prices changed to reflect the savings in selling to an intra-company division instead of to the outside market. Sales and distribution costs are bound to be lower and the selling division should thus accept a price under that of the market.

Dean finds basic agreement with Cook that some variation of a market system leads to fair treatment and provides the motivation to meet the aims of each division,

¹⁵Joel Dean, "Decentralization and Intra Company Pricing", Harvard Business Review, Vol.33 (July-August 1955)P.68

¹⁶Ibid.

and the firm as a whole.

Application of Transfer Pricing to the Shops

Application of a suitable transfer pricing method to the unique situation of the Shops requires some consideration. The goals of the Government of Alberta do not parallel those of a business enterprise, but our analysis has shown that in the achievement of those goals, activities at the level and of the nature of those carried out by the Shops are similar to the activities of private firms. This has formed the basis for the approach to the question of transfer pricing to follow.

Transfer prices based on some form of cost are not suitable for providing the information that will aid in the meeting of the Department's goals. Transfers at cost are taking place at present, and in the opinion of Department management, they fail in this critical role. An important aspect of this lack is that transfers at cost do not provide an adequate information base on which to evaluate the financial performance of the Shops, previously pointed out as the major requirement of the information system. Cost data would be informative but would be of little aid in determining if the Shops were meeting its goals of providing services at a lower cost than private groups.

The point that cost transfers fail to motivate the search for cost efficiencies is an important one for the Shops which has been discussed previously.

Market based transfer pricing could form the basis of a profit-loss system that would aid the evaluation of the financial performance of the Shops. Given that it is established as an accounting entity, the profit-loss statement offers the best means of measuring the Shops' efficient usage of public funds, and the best means of providing information on the achievement of Department goals.

Market based pricing ensures that the operating managers receive services priced at prevailing competitive levels. This method provides a clearer indication of the true cost of a given project, and precludes the practice of hiding significant costs in a variety of appropriations.

In pricing at market levels, the Shops will be receiving revenue that reflects the true value of its services. If the stated goals are to be met, it is clear that all expenses must be covered by the "true value" revenue. If this is not the case, it can be seen that the Shops are not able to provide their services at prices equivalent to those obtained from private enterprise.

The rejection of marginal costing for the Shops brings up the question of whether this type of costing would ever be appropriate under the proposed system. Certainly in the short run in which idle facilities are available for use it would appear to be feasible. Existing facilities have a major impact in the short run, an impact which leads to the encouragement of their usage at marginal costs. In the long run, however, it is not desirable to allow the

existence of such facilities to exert too great an influence on planned allocations of resources. Such influences could have occurred on some occasions in the past when lack of performance measures made effective decision criteria hard to obtain. The presence of facilities which required partial replacement or additions might have induced unwarranted expenditures in these cases. It is felt that accounting measures, while possibly allowing marginal costing on occasion, will aid in providing criteria for deciding whether such long term allocations consist of efficient use of funds.

Is a Profit-Loss System Equitable for the Shops?

Some discussion on whether a profit-loss system is equitable for the Shops is in order.

Firstly, the Shops faces a closed market and has no opportunity to sell its services to groups outside the Government. This is disadvantageous to the development of activities that could be made feasible through economies of scale. Thus, the Shops might have the capability of profitably offering a special welding service, but might not be able to do so because of insufficient requirement for that service within the confines of the Government departments.

The Shops will also be faced with providing a host of minor services on special occasions that private groups are often reluctant to supply. Some electrical contractors, for example, treat minor house calls as nuisance requests and exercise a prerogative in avoiding them. The Shops will be

unable to take such a stand in dealing with the Department.

There are several areas in which the Shops will have advantages over private groups which will tend to keep their costs lower. These are:-

1. The Shops will have closer co-ordination and better communication with the operating group than will private groups.
2. The Shops will have a substantially better knowledge of the buildings and systems with which they must deal.
3. The Shops will have no sales costs.
4. The delays inherent in tendering before private groups can be used will work in favor of the Shops on minor and rush jobs.
5. The Shops will not be in the return-on-investment-adequate-profit squeeze felt by private firms.
6. As the Shops purchases material through the Government purchasing body, it receives volume discounts that are not as readily available to small private firms.
7. The Shops need not pay Federal taxes on many categories of material purchases.

It can be concluded from the subjective evaluation that the advantages the Shops has over private firms outweigh the disadvantages, and that a profit-loss system is an equitable one.

CHAPTER V

A HUMAN APPROACH TO ACCOUNTING SYSTEMS

Introduction

This section of the thesis concentrates on the human element involved in the design and implementation of performance measurement systems. The chapter discusses the traditional assumptions of human behavior and accounting that prevail in the use of authoritarian systems of management, and the dysfunctions that can arise through such use. In searching for a better approach, participative systems of management and their impact on accounting are briefly examined. The chapter ends with derived recommendations for the design and application of accounting systems.

The Traditional Assumptions of Human Nature and Accounting

Behind every management decision or action lie: assumptions about human nature and human behavior. McGregor feels that many of the assumptions regarding human nature that are currently used by management in operating the organization were derived and evolved from the first large formal organizations, the military and the Church. It hardly need be stated that the aims and purposes of most modern businesses have little relationship with those of the army

and the Church, and yet these latter groups have bequeathed a legacy of management philosophy which continues to pervade the operation of most of our large firms. It is this legacy of authoritarian leadership that McGregor feels has resulted in the organizational rigidity which has blocked the opportunities for the individual to satisfy his needs within the corporate structure.

McGregor has listed some of these assumptions which are implicit in much of the organizational literature and which are accepted as standard by most organizations. He has collectively labeled them as "Theory X", and they are as follows:

1. The average human being has a dislike of work and will avoid it if he can. This assumption reflects an underlying belief that management must vigorously counteract an inherent human tendency to avoid work.¹

2. Most people must be controlled, directed, coerced and threatened with punishment to get them to put forth adequate effort toward the achievement of organizational objectives.²

¹Douglas McGregor, The Human Side of Enterprise, N.Y: McGraw-Hill Co. (1960), P.33

²Ibid, P.34

3. The average human being prefers to be directed, wishes to avoid responsibility, has relatively little ambition, and wants security above all. Although this assumption is rarely stated in so blunt a manner, McGregor feels that it is easy to see it reflected in policy and practice.³

These assumptions build into a "carrot and stick" theory of motivation which have profound consequences on the management environment of the corporation. In turn the accountants within the firm tend to react to this environment and to adopt the views of management and practice them as their own.⁴ The nature and scope of the management accounting system thus produced is materially influenced by the view of human behavior which is held by the accountants who design and operate these systems.⁵

Within the framework of the management style described by McGregor as Theory X, it is possible to develop a sub-framework of accounting systems. Caplan has done this and has concluded that some of the assumptions with respect to the

³Ibid.

⁴E.A. Fleishman, E.F. Harris, H.E. Burt, "Leadership and Supervision in Industry", People and Productivity, R.A. Sutermeister (ed) N.Y: McGraw-Hill (1969) PP 392-394

⁵E.H. Caplan, "Behavioral Assumptions of Management Accounting", Accounting Review, (July 1966), PP.496-509

role of accounting that have evolved from such management practices are as follows:⁶

1. The accounting system is a control device which permits management to identify and correct undesirable performance.

2. There is sufficient certainty, rationality and knowledge within the system to permit an accurate comparison of responsibility for performance and the ultimate benefits and costs of that performance.

3. The accounting system is neutral in its evaluations—personal bias is eliminated by the objectivity of the system.

It can be seen that an accounting system based upon these three statements is congruent with Theory X. Such a system sees accounting data as unbiased, objective information designed to keep close control over the actions of individuals within the firm.

Argyris has done substantial work in the area of determining the effect that the use of such accounting systems has on people, the relationship this use creates between people, and the overall effect it might have for the organization as a whole. The use of accounting techniques as a basis for reward and punishment leadsto severe organizational problems, according to Argyris.⁷

⁶Ibid,

⁷Chris Argyris, Human Problems With Budgets, Harvard Business Review, (Jan-Feb 1953) P.97

Four of the important human relations problems pointed out by Argyris are paraphrased below:⁸

1. Accounting systems (budgets) can lead to intense pressure that unites employees against management and has a detrimental effect on the achieving of organizational goals.

2. The accounting staff can obtain feelings of success only by finding fault with operating people. This fact leads to many human relations problems.

3. The punishment - reward aspects of accounting systems tends to make each supervisor see the problems of his own department to the exclusion of the problems of the firm.

4. Supervisors use accounting data as a way of expressing their own leadership pattern which can often result in people getting hurt.⁹

These combined problems can lead to severe tension amongst employees who are pitted against each other in an attempt to dodge the blame that has been assigned by an accounting variance or budget deviation. Persons who are living in an atmosphere in which there seems to be a necessity to find out whose fault everything is tend to lose their spontaneity.¹⁰ Under these conditions one learns to play

⁸Ibid.

⁹Ibid.

¹⁰Charles Gragg, "Whose Fault Was It?", Harvard Business Review, (Jan-Feb 1964), PP.107-110

cautiously, to minimize risks and thus to self-curtail the freedom to experiment and innovate.¹¹ In the end, the loser is the organization which fails to produce the best from its people.

The tension created by such an environment leads to frustration, withdrawal, apathy, and indifference.¹² As Argyris has pointed out, an outgrowth of these feelings can result in the formation of informal groups in the plant that tend to oppose management and to thwart the achievement of their goals.

As well, poorly implemented accounting systems can act to work against the synergy that has made an organization strong. As Ansoff states, the organization is a force which is greater than the sum of its separate parts.¹³ But accounting systems, responsibility accounting, and budgeting, tend to force a concern by supervisors of the organization's separate parts rather than with the whole. The accounting system tends to imply that if everyone looks after the trouble in his department, there will be no trouble in the plant.¹⁴ This approach can be seen to divide the departments and helps

¹¹Ibid.

¹²Argyris, Op. Cit., P.102

¹³H.I. Ansoff, Corporate Strategy, N.Y: McGraw-Hill Co. (1965) P.75

¹⁴Argyris, Op. Cit., P.105

to work against the effects of synergy which has made the firm strong in the first place.

Likert and Seashore have done research on the effect of pressure used by management to reduce cost and increase efficiency in the plant.¹⁵ Accounting and cost control systems are often used in such situations as a means of applying pressure and motivating effort to gain these ends. The applied pressure results in the use of accounting and measurement systems in the punitive fashion which Argyris finds unpalatable. Through the correlation of research work done by other social scientists and applied to the cost control situation, Likert finds that extended pressures for improvements in production and costs causes a deterioration in employee attitudes, performance goals, work motivation, and accuracy of communication.¹⁶ There is an increase in the number of supervisory and other employees who resent the pressure and find it unreasonable, just as Argyris concluded. Likert finds that as a result the entire organization's capacity to function effectively begins to decrease, and performance drops.

In spite of the fact that pressure remains high the actual performance on costs and productivity starts to drop back over a period of time from the favorable level achieved

¹⁵R. Likert, S. Seashore, Making Cost Control Work, Harvard Business Review, (Nov-Dec 1963), P.96

¹⁶Ibid, P.99

during the early phases of the planned cost reduction.¹⁷

This drop in earnings and productivity stems from unfavorable developments in the organization such as absenteeism, turnover increases (especially amongst able employees), worsening labor relations, grievance increases, and product quality deterioration.

Overview

It has been seen that the use of accounting systems based on authoritarian approaches to management often results in substandard organizational performance. The discussion now turns to a different philosophy of management which promotes a more human oriented use of accounting systems.

A Participative Approach to Management

Rensis Likert has taken managers with superior records of performance in American business and has conducted empirical work which contrasts the general pattern of management used by high producing managers with that of low producing managers.¹⁸ Likert finds that high producing managers are more considerate of their employees, are good at dealing with people, tend to have the skill that builds high peer

¹⁷Ibid.

¹⁸R. Likert, New Patterns of Management, N.Y: McGraw-Hill Co. (1961)

group loyalty within their departments, and exert less unreasonable pressure on their men for better performance.¹⁹

Likert's major point is that such managers do not solely rely on the economic motive of buying a man's time or by using control and authority as the organizing and coordinating principle of their organizations.²⁰ Rather they are human oriented administrators who attempt to tap other motives to yield favorable and co-operative attitudes amongst employees and thereby achieve a maximum effort toward meeting individual and organizational goals.

Likert further finds that the total amount of control exercised by a manager may be quite different from that delegated to him by the hierarchy.²¹ Managers who are human oriented, and are high producing, have much more influence than do managers who are task oriented and low producing. The former increase the "influence pie" and exercise more control than do the latter. This corresponds to the study of Smith and Tannenbaum²² who found that substantial control exercised by both leaders and members appears to be a correlate of high organizational performance.

¹⁹Ibid, P. 5-44

²⁰Ibid, P.98

²¹Ibid, P.57

²²C.G. Smith, A.S. Tannenbaum, "Organizational Control Structure: A Comparative Analysis" in A.S. Tannenbaum (ed) Control in Organizations, N.Y: McGraw-Hill (1968) P.86

In proposing an organizational concept that would implement some of his findings, Likert uses as a corner-stone his principle of supportive relationships which states that -

The leadership and other processes of the organization must be such as to ensure a maximum probability that in all interactions and all relationships with the organization each member will, in the light of his background, values, and expectations, view the experience as supportive and one which builds and maintains his sense of personal worth and importance.²³

He goes on to suggest an overlapping type of organization made up of highly cohesive groups. These groups are co-ordinated through a "linking pin" who, as a supervisor of one group and a subordinate of another higher level group, performs the required communication function between the two.

Likert sees the work of the organization as being carried out in the group context, and thus the group is a pivotal factor in that it must be a tightly knit highly effective element within the organization. The leader must be interested in his men, have confidence in their ideas, and be aware of their needs. The environment must be conducive to effective communication between all members and each must have the opportunity to contribute to the whole. Each member must be sensitive in his inter-personal relationships and be aware of the influence of others. Likert puts the group forward as the primary vehicle through which the individual can meet his needs, and at the same time exercise

²³Likert, Op. Cit., P.103

effort on behalf of the organization.

In Likert's approach the greater amount of control that is purportedly exercised for the benefit of the organization is more of a mutual than a unilateral type. Both individual choice and collective social constraints combine to make up the method by which the participant's behavior is regulated. Again, the group is seen as playing a main role through the collective formulation of norms and goals.

Douglas McGregor²⁴ focuses on the individual in his approach to integrating the employee and the organization. Drawing on Maslow's work in motivation theory, McGregor centers on the egoistic needs, those that relate to one's self-esteem and to one's needs for status, recognition, and appreciation as the needs that are rarely fully satisfied and as such provide significant potential for the motivation of the individual in his employment world. McGregor applies Maslow's theory to develop assumptions regarding the nature of man and his relationship with his job. These assumptions are termed Theory Y and are paraphrased as follows:²⁵

1. The expenditure of physical and mental effort in work is as natural as play or rest.
2. Man will exercise self-direction and self-control in the service of objectives to which he is committed.

²⁴McGregor, Op.Cit.

²⁵Ibid, p. 47-48

3. Commitment to objectives is a function of the rewards associated with their achievement.

4. The average human being learns, under the proper conditions not only to accept but to seek responsibility.

5. The capacity to exercise a high degree of imagination, ingenuity and creativity in the solution of organizational problems is widely, not narrowly, distributed in the population.

6. Under conditions of modern industrial life, the intellectual potentialities of the average human being are only partially utilized.

McGregor argues that the central condition which derives from Theory Y is that of integration; the creation of conditions such that members of the organization can achieve their own goals best by directing their efforts toward the success of the enterprise.²⁶ This is achieved through participation, a process in which the individual is given the major responsibility for his own development and job design within broad guidelines of organizational need and through honest negotiation with his supervisor. Whereas for Likert participation is an important process in the overall scheme of aiding the individual meet his own goals, for

²⁶Ibid, p.49

McGregor it is the panacea which utilizes the most effective means of control, that which is internally motivated. By establishing his own goals and expressing his own desires and needs in his job, the employee will form a real commitment to their attainment. This commitment results in self-direction and self-control in the meeting of these objectives to the mutual benefit of the individual and the organization.

Caplan has studied approaches to management such as those put forward by Likert and McGregor and from them has derived a set of assumptions on which to base accounting practice. His assumptions seek to promote a new outlook on accounting that will mitigate the dysfunctions created by the traditional means of using accounting systems. There are as follows:²⁷

1. The management accounting process is an information system whose major purposes are:

- a) to provide data for decision making.
- b) to serve as a communications medium within the organization.

2. The effective use of budgets and other accounting control techniques requires an understanding of the interaction between these techniques and the motivations and aspiration levels of the individuals to be controlled.

²⁷Caplan, Op. Cit.

3. The objectivity of the management accounting process is largely a myth. Accountants have wide areas of discretion in the selection, processing and reporting of data.

4. In performing their function within an organization, accountants can be expected to be influenced by their own personal and departmental goals in the same way as other participants are influenced.

Caplan's assumptions recognize motivation theory, the drive of the individual in pursuing satisfaction of his needs, and the fact that the accounting system itself cannot be absolutely objective in its attempts at measurement and control. The application and design of accounting systems under these conditions in order to reach the goals of the organization are not completely straight forward, however. As accounting by its nature appears to harbor aspects of control and blame, it is important to handle its design and application with much care.

Application and Design of the Performance Measurement System

Drawing on the work of the authors discussed above, it is possible to formulate some hypotheses as to how accounting systems would take into consideration the needs of the individual.

In the application of accounting systems, it must be recognized that many of the unfavorable consequences are

caused not by the measurement process itself but by the way it is handled. Rosen and Schneck²⁸ contend that a good deal of the dysfunctional consequences arise because the system is used as a punitive tool by management. Miles and Vergin²⁹ feel that conditions specifically allowing the "freedom to fail" are necessary to achieve motivation through the accounting system. An atmosphere of general management approval must be generated, as such an atmosphere has long been recognized as a first step to effective leadership and as essential in the development of a co-operative control atmosphere.³⁰ Thus, even when performance is not up to standard, management's attitude should be one of supportive, consultative assistance in recognition that one substandard performance does not impugn an individual's character.³¹

An important principle to be followed by management in creating a proper atmosphere is that attempts to impose

²⁸L.S. Rosen, R.E. Schneck, "Some Behavioral Consequences of Accounting Measurement Systems", Accounting and Its Behavioral Implications, W.J. Bruns, D. Decoster, N.Y: McGraw-Hill Co. (1969) P.174

²⁹R.E. Miles, R.C. Vergin, "Behavioral Properties of Variance Controls", Accounting and Its Behavioral Implications, W.J. Bruns, D. Decoster, N.Y: McGraw-Hill Co. (1969) P.373

³⁰Ibid, P.376

³¹Ibid, P.374

accounting standards and controls on the individual from above are successful only to the extent that they are accepted by him as being legitimate and fair.³² This implies firstly that the individual have a major say in the establishment of the standard that will be the measure of his performance. Only through honest participation can the employee express his needs via accounting goals, and only through internal acceptance of these goals can he seek satisfaction by their subsequent achievement. Secondly, such participation will meet the employee's desire to be treated fairly and honestly, a factor whose absence can result in unhappiness, as pointed out by Herzberg.³³

Quick feedback is a major design criteria that must be provided by the system, as it has been shown that the need to know is an important influence in the establishment of an individual's aspiration level.³⁴ A person constantly seeks re-assurance of his efforts and continuously changes his sights for achievement in accordance with the results of the feedback. Thus, successful attainment of the accounting goal to

³²Ibid, p.372

³³F. Herzberg, B. Mausner, B.B. Snyderman, The Motivation to Work, N.Y: John Wiley and Sons, (1959)

³⁴Ross Stagner, "Level of Aspiration", People and Productivity, R.A. Sutermeister (ed), N.Y: McGraw-Hill Co. (1969) PP 146-147

which the individual is committed results in a feeling of satisfaction and the voluntary raising of the performance standard. The new goal is the new challenge and the new commitment of the employee.

As pointed out previously, there is little objectivity in management accounting due to the wide variety of procedures and practices an accountant may use in a given situation. Yet few would suggest that this is sufficient reason for abandoning any attempts at measuring performance by accounting systems. Rather, the system should recognize that no single absolute figure represents the "truth" about a given situation. Even the most precise manufacturing process whose resulting efforts can be measured to thousandths of an inch have acceptable tolerance limits, and accounting, which is substantially less exact, should adopt a similar technique in establishing performance standard figures. An upper and lower figure would result in an acceptable area of performance and would recognize the vagaries of the measurement technique. Such a procedure would remove the automatic stigma of failure attached to narrowly missing a single performance standard, and preclude the necessity of management action at each such occurrence.³⁵

³⁵Miles and Vergin, Op. Cit., P.373

Conclusion

In designing and implementing the suggested system for the Shops the following guidelines should be considered.

1. The management atmosphere should be human oriented.
2. The standards established must be accepted as legitimate and fair by those who must meet them.
3. The system should provide quick feedback to enhance performance.
4. Tolerance levels should be developed for the accounting standards to be used.

CHAPTER VI

MANAGING THE PROPOSED SYSTEM

Introduction

This chapter initially discusses a means of operating and administering the transfer price system suggested in an earlier chapter. It then proposes a simple approach to costing and budgeting as a means of planning and control, an essential part of the profit-loss system that has been put forward as the major means of measuring the Shops financial performance. The chapter ends by suggesting an approach to determining the quality of service provided by the Shops and provides an example of measuring the performance of an important Shops' program.

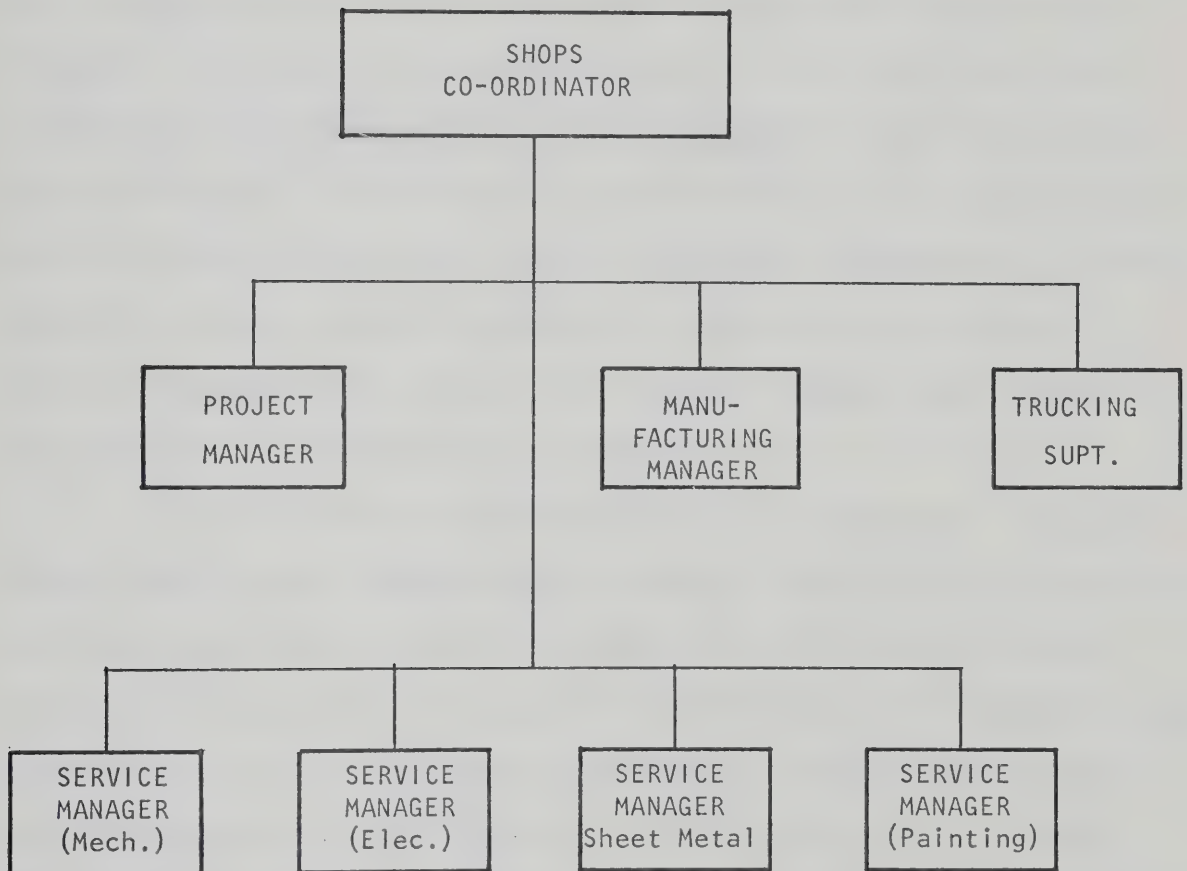
Operation of the Transfer Pricing System

The proposed organization of the Shops is shown in Figure 5, which indicates the formation of seven major departments. For most of these departments a reasonable set of market prices suitable for use as transfer prices appear to be generally available. Dearden¹ has suggested several ways

¹J. Dearden, "Interdivisional Pricing", Harvard Business Review, (Jan-Feb 1960) PP 121-122

Figure 6.1

DEPARTMENT OF PUBLIC WORKS SHOPS ORGANIZATION



of gathering such prices. For commonly supplied services, published price lists are often available from private firms. Formal quotations may also be used on occasion as a source of competitive pricing data. Current pricing experienced on on-going jobs is yet another valid source. Dearden also suggests that historical pricing data, if it has been kept, is a means of checking not only on current prices but also on pricing trends. Such data may be valuable to the organization over the medium term as a source of price information. These several sources should suffice for the purposes at hand. Prices can be set at competitive market levels and checked at appropriate intervals for any changes.

In the case of the manufacturing department, existing fixed facilities constitute a problem. Short term fluctuations in the competitive market, if applied in this case, could result in a decision of premature withdrawal from manufacturing. Once such a withdrawal has taken place, a large investment and substantial effort would be required to start up again should prices improve and stabilize. Dearden² recommends the use of longer term price levels that will smooth out the fluctuations in cases where fixed investment facilities play a major role in the manufacturing process. This is a feasible approach for the Shops as well.

²Ibid, PP 119-120

The situation facing the Shops with respect to transfer pricing, however, is not exactly the same as that facing a division of a firm which is selling a tangible product. The division accepts the market price for its product and is motivated to improve internal operations to assure a profit. This is not totally true in the case of the Shops. Although transfer prices are available on the types of services they supply, there is no automatic control on the efficiency with which they carry out a given job. That is to say, an electrician's time may be competitively priced at \$10.00 an hour by both the Shops and private firms, but there is no guarantee that the former will not take twice the time of the latter to complete a task.

The solution envisaged is one combining estimates by the Shops and a competitive system that allows building managers to use private groups at their own discretion. The estimates will be performed by Shops personnel on projects of sufficient size to warrant the trouble required to carry them out, and will constitute the fixed charge which will be levied by the Shops for the performance of the work, regardless of the final cost of that work. Any "losses" must be absorbed by the Shops and any "profits" will accrue in their favour in accordance with the revenue-expense scheme proposed earlier. Any estimate felt by the building manager to be too high can be rejected in favour of a quotation from a private

firm. The accumulation of information on the costs of various projects could be used as an effective means of controlling the estimating practices of the Shops, and the competitive element should provide additional motivation for the improvement of their methods and procedures. Smaller jobs not requiring estimates may be allocated to the Shops on a continuing basis as long as building managers are satisfied with the cost performance and service received.

This system would be acceptable to the majority of Shops' service managers, many of whom are confident that they can effectively compete with private enterprise.³ In addition it will answer the question of whether or not the Shops can compete on this basis and will provide information that can serve as a guideline for improvement.

It will be the responsibility of the Shops to provide estimators who are capable of relatively accurate estimations of project work. Gross deviations between estimates and final costs can be investigated as to cause, and this continual feedback should result in a growing competence to estimate more accurately.

³Interviews with six Shops' Service Managers.

Administration of the Transfer Pricing System

For the administration of the system it is proposed that a committee be established consisting of the Director of the Physical Plant Division, the Special Services Engineer, the Shops Co-ordinator or the Shops Administrator, and a Physical Plant Administrator. The purpose of the committee would be to review and set transfer pricing rates at reasonable intervals, perhaps semi-annually. Information from outside sources would be gathered and prepared for the committee's consideration.

The committee's makeup would be designed explicitly to take advantage of the philosophy of participative management. The Shops would have a strong voice in the form of one of their two top management personnel, as would the operating group. The remaining two positions would be filled by neutral members who would have nothing to gain by a decision favouring one side or the other. It is felt that this arrangement would allow free and open discussion and thereby aid the formation of solid and acceptable decisions.

The committee would be a court of last resort for any disputes that might arise that cannot be settled through regular means of negotiation and compromise. Thus the Shops may dispute the action of a building manager in purchasing services elsewhere if it is felt that such an action is contrary to the best interests of the Department as a whole. The

non partisan committee would consider the relevant variables and arrive at a fair decision that is binding on the parties.

An Approach to Cost Accounting

Some aspects of cost accounting will now be discussed in suggesting guidelines for a feasible cost control system for the Shops.

Horngren⁴ states that in cases where products and/or projects are readily identified as individual units, each of which receives varying degrees of attention and skill, job order costing is the appropriate system of costing to use. The Shops' duties, a large part of which are done on an as-required basis, often vary in nature, in amount and skill of labour required, and in location, and fit the characteristics of job order costing which seeks to apply costs to specific jobs. This type of costing is, therefore, used in the proposed system.

For control purposes seven cost centers may be established as depicted on the organization chart, Figure 5. Responsibility for costs incurred and for all materials used by its employees must rest with the management of each center. This segmentation of responsibility allows the gathering of

⁴C.T. Horngren, Cost Accounting: A Managerial Emphasis Englewood Cliffs, N.J: Prentice-Hall Inc. (1967), P.69

more comprehensive cost information and facilitates the identification of problem areas, should they arise.

A job cost sheet similar to that in Figure 6 would be suitable for cost collection on all manner of jobs, even those that typically require different kinds of material and labour skills. These sheets would act as the central location for cost gathering on jobs, and would aid the control function through facilitating comparisons between the estimates and the actual cost incurred.

A simple flow diagram of costs is shown in Figure 7. Workers fill out a work ticket for each job, and these direct labour costs are gathered both by job and by cost center. Material costs are handled in the same manner. Certain overhead costs such as indirect labour, undistributed labour, fringe benefits and holiday pay can be gathered by cost center and applied to jobs on an overhead rate per direct labour hour. Other overhead categories such as utilities and insurance, are difficult to allocate to cost centers and are more logically gathered for the Shops in total and then allocated on a direct labour hour basis.

The cost gathering and estimating system can be refined to the extent that experience and the particular needs of the Shops dictate. Costs may be classified and gathered in any one of several different ways that could provide the required information to help improve future operations. The classification could be by trade, by type of work within the

Figure 6.2

JOB COST SHEET

JOB COST SHEET																				
DATE STARTED:		JOB NO.																		
DATE COMPLETED:		BUILDING NO.																		
COST CENTRE A																				
DIRECT MATERIAL		DIRECT LABOUR		OVERHEAD																
	<u>Amount</u>		<u>Amount</u>		<u>Amount</u>															
COST CENTRE B																				
DIRECT MATERIAL		DIRECT LABOUR		OVERHEAD																
	<u>Amount</u>		<u>Amount</u>		<u>Amount</u>															
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TOTALS:	CENTRE A	_____	GRAND TOTAL	_____																
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	SHOPS OVERHEAD	_____	PROFIT	_____																

SOURCE - Adapted from C.T. Horngren, Cost Accounting: A Managerial Emphasis, Englewood Cliffs, N.J: Prentice-Hall Inc. (1967) P.70

trade, or by characteristics of the job performed. For example, a mechanical contractor found that by identifying several cost classifications in installing water pipe that relative to standard cost data, his firm was much more adept at installing cast iron drainage pipe under building slabs than copper water service lines in ceiling spaces.⁵ This led to more emphasis on obtaining jobs with a large percentage of drainage piping. Applying this concept to other aspects of their work allowed the firm to more clearly identify their areas of special competences, and to take advantage of them in their work. This concept would clearly be applicable in the case of the Shops as well.

Budgeting

For the Shops a system of budgeting would aid the development of an approach to planning that would also be an integral part of their overall control system. As Shillinglaw⁶ has stated "The main elements of the budgetary process relate primarily to planning and control by feedback response".

⁵Conversation with J.C. Burton regarding the experiences of Jamison and Kruger Co. Ltd., Mechanical Contractors.

⁶G. Shillinglaw, "Divisional Performance Review: An Extension of Budgetary Control", in Bonini, Jaedicke and Wagner, Management Controls: New Directions in Basic Research N.Y: McGraw-Hill (1964) P.308

Anshen⁷ sees the budget as organizing, influencing, facilitating and expressing management thought and management action. When it is properly designed it can "contribute powerfully to the effective and efficient accomplishment of managerial tasks".⁸

The budgeting process will involve the establishment of short and long-term goals for the Shops. The long-term goals, as expressed earlier, are carefully formulated to be congruent with those of the Department. The short-term goals must likewise be co-ordinated, and the budgeting process can be the means of accomplishing this in terms of allocation of resources. As Anshen⁹ has stated, resources are rarely, probably never, equal to needs. It is the essence of the budgetary process to ration these scarce resources for the accomplishment of such goals. This will be a major aspect of budgeting in the case of the Shops.

A Framework

In the budgetary process effort should be made to separate the performance of one segment of the organization from the others.¹⁰ This implies that the budget should be

⁷M. Anshen, "The Federal Budget as an Instrument For Management and Analysis", in D. Novick's Program Budgeting N.Y: Holt, Rinehart & Winston (1969), P.3

⁸
Ibid.

⁹
Ibid.

¹⁰Shillinglaw, Op.Cit., PP.305-307

constructed to highlight the activities of each of the seven Shop cost centers, a procedure which correlates with the proposed costing system which gathers costs on the same basis. The budget, however, must not serve to divide the organization to the extent that the strength of the whole is impaired. This danger which occurs in the budgeting process must be particularly guarded against in the case of the Shops which depends upon a frequent exchange of men between groups as various manpower needs fluctuate. This exchange and the transfer of technical aid contributes to the effectiveness of the organization and must not be hindered by too great an emphasis on budgeted figures.

As the budget must be goal directed, each center would be responsible for formulating its own short and long term goals. Group decision making would be encouraged and the tradesmen allowed a chance to play a meaningful role in decisions. This would mean a group decision on goals and budget figures.

A budget figure or standard thus determined would be passed onto management for approval, but would not necessarily be subject to veto. The bargaining process would play an important part here as the participative approach accepts that regardless of whether management is totally pleased with the standard set, a standard to which the group is committed will induce superior performance to a standard that is unilaterally imposed upon it by management. The latter may not be accepted by employees as a standard at all.

What occurs in this approach is a reversal of the traditional method of handling budgets. Rather than a management group carefully determining the standards to be set and informing lower levels accordingly, the opposite has evolved with hopefully, a more realistic result. The flow of information is upward rather than downward.

This method recognizes that the accounting figure itself may have little or no effect as a means of control. Careful design and implementation of these systems may be largely wasted if the figures are not accepted by the group. Miles and Vergin,¹¹ Ridgway,¹² and others have pointed out the elaborate devices for subterfuge adopted by employees who reject such controls, the lesson being that management must be aware that it is often group norms that provide the motivation to achieve a given accounting goal.

It is visualized that there will be both an operating budget and a capital expenditure budget. The former to show the costs of operation and the latter to detail the capital expenditures for the coming year.

¹¹R.E. Miles, R.C. Vergin, "Behavioral Properties of Variance Controls", in W.J. Bruns, D.T. DeCoster, Accounting and its Behavioral Implications, N.Y: McGraw-Hill (1969) P.373

¹²V.F. Ridgway, "Dysfunctional Consequences of Performance Measurements", Administrative Science Quarterly, (Sept.1956), PP.240-247

It is important that the budget indicates the future impact of any currently proposed expenditures.¹³ Often an allocation in one year commits the organization to further expenditures in succeeding years. The purchase of a diesel truck by the Shops and the hiring of a competent operator either commits the trucking group to operating and maintenance expenditures in subsequent years or to an unpleasant and costly divestiture of equipment and personnel. The initiation of a long-term training program also has longer term implications and the budget should outline these factors as much as possible.

As part of the budgeting process, it is envisaged that existing programs and goals be carefully examined.¹⁴ The traditional approach to budgeting often provides too much focus on expenditures in the past as the foundation by which to predict expenditures for the future. It is suggested that this practice be bypassed in favour of a re-evaluation of the basic programs and objectives on which the previous budget was based. Some analysis of the output of particular efforts in terms of goals would be of value. A manpower planning program that sought to utilize existing manpower in productive effort eighty percent of the time must be evaluated not only

¹³Charles L. Schultze, The Politics and Economics of Public Spending, Washington, D.C.: The Brookings Institute (1968) PP 19-25

¹⁴Ibid.

in meeting its goal, but in the efficacy of that goal in light of changing circumstances and organizational requirements.

As a further part of the budgeting procedure alternatives should be developed for achieving certain objectives.¹⁵ Although this may not always be feasible for the Shops which is concerned with numerous resource allocations, many of which are not of a size to warrant formal searches for alternatives, major expenditures should be subject to this process. The provision of additional trucking duties for the Department can be handled through the purchase of new trucks, the leasing of trucks, or the hiring of private vehicles. The economics of the situation would clearly play a large role in the final decision of which method to use.

Some consideration should be given to flexible budgeting for the Shops. Such a budget usually refers to overhead costs, and is prepared for a range of activities rather than for a single level.¹⁶ It can automatically be geared to changes in the level of volume and does not indicate favourable or unfavourable performance except in terms of the actual volume of goods and services produced. It is particularly

¹⁵Ibid.

¹⁶M.J. Gordon and G. Shillinglaw, Accounting: A Management Approach, Homewood, Illinois: Richard D. Irwin (1969) P.706 and Horngren, Op.Cit., PP 201-202

adaptable in situations where volume may vary due to a number of uncontrollable factors, and the Shops is in such a situation where political or similar considerations could lead to fluctuations.

Although the budget is performance oriented, when operating results are reviewed emphasis must be placed on the informational aspects of the situation. As pointed out previously, the results will indicate areas that have satisfactory performance as well as areas that require improvement. The figures must be used as guidelines for future action rather than to pinpoint and allocate blame.

Information From the Customer

Effective communication between the Shops and the building superintendents is required to evaluate the extent to which the Shops is meeting its goal of providing high levels of service. The co-ordination of work, feedback as to its quality, and the handling of various projects with regard to the convenience and needs of the client department are some areas in which the Shops requires information. It is suggested that meetings between Shops management, building superintendents and physical plant managers would be one means of accomplishing this. Possibly a portion of the regular physical plant managers' meetings could be scheduled for a give and take session with the Shops. On projects over a certain size, for example \$10,000.00, a short form could be

filled out by the superintendent or manager as a permanent record of the information outlined above. Feedback on such projects could be transmitted during the meetings as suggested. The aim of the overall exercise would be to provide important information to the Shops in an atmosphere of mutual support as an aid to improving their operations.

An Illustration of Performance Measurement

The Shops will require performance measurement criteria for some of its larger programs, and the preventive maintenance program is chosen as an important illustrative example. The goal of this program is to pursue a level of maintenance that will minimize equipment deterioration and assure continuing operation of critical equipment commensurate with the costs of so doing. The program is a large and diverse one covering Government facilities throughout the province, and encompassing equipment used in all types of applications from critical medical service to standard heating and air conditioning usage. As this is the case, specific performance measures suitable for all such instances are difficult to develop. Rather the aim of the program must be scrutinized as a means of establishing measures, the most appropriate of which may be applied in a given situation. Some measures formulated through this procedure follow.

1. Total number of equipment breakdowns.
2. Number of breakdowns on critical service.
3. The cost of repairs resulting from breakdowns.
4. The cost of equipment replacement resulting from breakdowns.
5. The cost of carrying out the preventive maintenance procedure.
6. Statistics on equipment life.

In considering air conditioning systems economic factors are very important in deciding on the level of maintenance to be used. In the case of a medical service involving human life, however, the funds required to keep equipment breakdowns to a minimum become a relatively less important consideration.

CHAPTER VII

RECOMMENDATIONS AND COMMENTS

Introduction

This final chapter concerns itself with some recommendations and comments pertaining to the study, its possible implementation, and to areas lying outside the study as well.

Recommendations

A factor of some importance is the actual use by management of the system proposed in the thesis. Especially in the case of the profit and loss statement it is recommended that particular effort be taken to temper results by an awareness of the effect of the political constraint on the overall situation. Certain ministerial or governmental decrees may require the Shops to take immediate and special effort on a particular project that serves to disrupt their regular operations and causes undesirable effects on their profit and loss picture. In these cases it must be recognized that political factors often overcome economic ones at some cost to the most efficient use of funds. The statement itself could still be useful in these cases by providing an estimate on the opportunity cost of carrying out this type of decree.

This information if fed back to those concerned would be valuable in making decisions regarding the extent to which economic consideration should be over-ridden in favour of political or other factors.

Another constraining factor on the proper workings of the overall system is the tendering procedure which must be followed before purchasing more than \$25.00 of material from a private supplier. This requirement is a hindrance on the automatic check on the Shops that private enterprise is supposed to provide through competition. If a four to six week period is required before the tendering procedure is complete and a successful supplier chosen, then this undesirable time lag will serve as a deterrent to the use of private firms. Should this deterrent prove to be powerful enough, it could cripple the operation of the system which is predicated on the Shops estimating competitively for the work available.

It is, therefore, recommended that effort be taken to remove or lessen the tendering constraint as much as possible. Perhaps special procedures can be worked out with the purchasing department to cut down on tendering time in special instances. An alternate solution could be the use of a standing order issued to an acceptable supplier that would serve to cover a variable volume of goods and services. This type of purchase order could be used several times, thereby precluding the necessity for re-tendering on each

occasion. A third alternative makes use of the fact that the constraint applies to materials and not to labour. Possibly arrangements can be made to supply Government materials and hire labour only from private firms. Whichever method is used, lessening the effect of the constraint is a desirable action to take.

It is recommended that any implementation take place in stages at a pace dictated by the organization's ability to react and adjust to the new system. Immediate implementation of the complete scheme, even if it were possible, would not be desirable for an organization that has developed along an alternate route for the past twenty years. Rather, it is suggested that sufficient time be taken to gather opinions of those who must work with the new scheme, to alter it accordingly, and to implement it on a gradual basis. A simplified sequence of implementation would be as follows:

1. Establishment of the Shops as an accounting entity so that all accounting records are distinct from those of other groups.
2. Development of a full costing scheme to charge full costs on any Shops work orders, rather than simply labour and material costs.
3. Gathering of transfer pricing information.
4. Implementation of estimating procedure with market prices used.

5. Gradual introduction of competitive element as a check on Shops work, and preliminary use of the profit and loss statement.
6. Full implementation completed.

Progress could be carefully monitored at a given stage before implementation of the next stage proceeds. It is visualized that the whole system would take at least a year to put into operation, and perhaps a good deal more, depending on the reactions experienced and the changes suggested by Shops personnel.

It is recommended that manpower planning be instituted at the Shops to assure the optimum allocation of the available work force. Although the study did not concern itself with this aspect, it is perceived to be one of significance. A work load which fluctuates drastically with the season requires a constantly changing labour force, especially in the project area which is concerned with construction and renovation, and requires many trade skills. At present there is a constant exchange of people between groups, and a constant hiring and releasing of men. With seven managers involved in this process there are bound to be duplications of effort and inefficient use of manpower. A solution can be found by co-ordinating this activity through a single individual who would be responsible for planning requirements, hiring and releasing men, and allocating tradesmen as required.

Trades training programs and other similar efforts might also be placed in this category.

Comments

A final comment concerns the applicability of the approach used in this study to other areas in the Department of Public Works. It is suggested that the approach could be successfully applied to numerous other situations that Department executives are currently pondering. One of these of particular interest is the extremely complex one of whether or not a particular building, or complex of buildings, is being operated in an optimum manner considering client satisfaction, economics and the wishes of the Government. An important task would be to develop an information system and the proper measures of performance to answer this question. The systems approach would be a fruitful one with which to start - as Churchman¹ says, "The systems approach is not a bad idea."

¹C. West Churchman, The Systems Approach, N.Y: Dell Publishing Co. (1968), P.232

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